

**PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re the Application of

Aslanis et al. (TI-27730A.1B)

Conf. No. 3583

Serial No. 10/757,195

Group Art Unit: 2611

Filed: January 14, 2004

Examiner: Fotakis

For: Frame Synchronization in Multicarrier Transmission Systems

**REQUEST FOR RECONSIDERATION**

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

Dear Sir:

This paper is presented in response to the Office Action mailed on April 8, 2008. It is submitted that this paper is fully responsive to that Office Action. Reconsideration of this application, based on the following remarks, is respectfully requested.

Claims 18 through 68 remain in this case. No claim is amended. Claims 1 through 17 were previously canceled.

Applicants note the allowance of claims 18 through 62.<sup>1</sup>

Claims 63 through 67 were rejected under §103 as unpatentable over the Jasper et al. reference<sup>2</sup> in view of the Bingham reference<sup>3</sup>. Relative to claim 63, the Examiner found that the

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<sup>1</sup> Office Action of April 8, 2008, page 6.

<sup>2</sup> U.S. Patent No. 5,343,499, issued August 30, 1994 to Jasper et al., from an application filed January 9, 1992.

<sup>3</sup> Bingham., *Proposed Standard: Sections 6.6-6.10 & 7.6 – 7.10: Encoders, Modulators, Cyclic Prefices, DACs, and Anti-Aliasing Filters*, Submission T1E1.4/93-120 to the T1E1.4 Working Group of Committee T1.

Jasper et al. reference taught all of the steps and limitations of claim 63, except for the particular weighted synchronizing pattern recited in the claim, which the Examiner found to be taught by the Bingham reference. The Examiner found that it would have been obvious to use the synchronizing pattern of the Bingham reference in the method disclosed by the Jasper et al. reference, in order to meet the standard described by the Bingham reference. The Examiner further found that the Bingham reference taught using such weighting factors in connection with whether to use the associated tone in such correlating.

Claim 68 was rejected under §103 as unpatentable over the Jasper and Bingham references, and further in view of the Hunt et al. reference<sup>4</sup>. The Examiner asserted that the Hunt et al. reference teaches increasing and decreasing the number of bits allocated to tones according to SNR, and that this bit allocation must be synchronized with the receiver. Based on this teaching, the Examiner found that the skilled person would have combined the Hunt et al. teachings with those of the Jasper and Bingham references to provide “desirable performance”.<sup>5</sup>

Applicants respectfully traverse the §103 rejection of claims 63 through 68, on the grounds that the Examiner has failed to make a *prima facie* case of obviousness against claim 63. Specifically, Applicants submit that the Examiner has erroneously asserted that each element of independent claim 63 can be found in the applied prior art references. Applicants further submit that the combined teachings of the applied references in fact fall short of the requirements of the claims.

In making this traversal of the rejection, Applicants assume, for the sake of argument only, that the Bingham reference is in fact prior art to the claims in this application. However, by making this argument, Applicants are not acquiescing to the conclusion that the Bingham reference is in fact prior art to the claims in this case. As stated in the Preliminary Amendment filed in this application on January 14, 2004, and as presented in the Amendment of January 28, 2008 relative to the Cioffi et al. reference<sup>6</sup>, while the Bingham reference bears a date that is

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<sup>4</sup> U.S. Patent No. 5,400,322, issued March 21, 1995.

<sup>5</sup> Office Action, *supra*, pages 5 and 6.

<sup>6</sup> Cioffi et al., “Modification to DMT Synchronization Pattern Insertion”, Submission T1E1.4/93-089 to the T1E1.4 Working Group of Committee T1.

earlier than one year before the priority date of this application, the assignee of this application cannot determine with certainty whether copies of the Bingham reference were provided or made available to the attendees of the Working Group meeting to which the submission corresponding to this reference was made, and cannot determine with certainty whether an oral presentation of the subject matter of the Bingham reference was made in that meeting. Accordingly, Applicants submit that the facts of record at this time do not establish that the Bingham reference is prior art to the claims in this application. However, in the spirit of completely and fully complying with the duty of candor and good faith in this application, and completely and fully serving the public interest by ensuring that the Patent and Trademark Office is fully aware of and can evaluate the teachings of all information material to patentability of the claims in this application, and in order to advance the prosecution of this application, Applicants traverse the §103 rejection of claims 63 through 68 assuming, for the sake of argument only, that the Bingham reference can be applied against the claims.

The current §103 rejection of claims 63 through 67 is based on a combination of the teachings of the Jasper and Bingham references.<sup>7</sup> In order to support a *prima facie* finding of obviousness on this basis, the Examiner must resolve the *Graham v. John Deere*<sup>8</sup> factual inquiries by, *inter alia*, articulate a finding that the prior art includes each element claimed.<sup>9</sup>

Applicants submit that the Examiner has not properly found each of the elements of claim 63 in the Jasper and Bingham references. Specifically, claim 63 requires the step of correlating the complex amplitudes of received values in a synchronizing frame with corresponding stored values of the synchronizing pattern, weighted by a weighting coefficient for each of the plurality of tones, to produce a comparison result. The Examiner asserted that, while the Jasper reference does not disclose a weighted synchronizing pattern, the Bingham reference teaches specified equations that define a weighted synchronization pattern. The rejection was based on the

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<sup>7</sup> Office Action, *supra*, pages 3 and 4.

<sup>8</sup> *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966).

<sup>9</sup> *MPEP*, §2143.A. See also *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); *In re Linter*, 458 F.2d 1013, 173 USPQ 560 (CCPA 1972); *In re Saunders*, 444 F.2d 599, 170 USPQ 213 (CCPA 1971); *In re Tiffin*, 443 F.2d 394, 170 USPQ 88 (CCPA 1971), *amended*, 448 F.2d 791, 171 USPQ 294 (CCPA 1971); *In re Warner*, 379 F.2d 1011, 154 USPQ 173 (CCPA 1967), *cert. denied*, 389 U.S. 1057 (1968).

conclusion that it would have been obvious to have used the “weighted synchronization pattern” specified in the Bingham reference in the Jasper system to conform to the standard.<sup>10</sup>

Applicants submit that the Bingham reference does not teach the correlating of complex amplitudes of received synchronizing frame values with stored values of the synchronizing pattern, in a manner that is weighted by a weighting coefficient for each of the plurality of tones. Because disclosure of this element is absent in the prior art, Applicants submit that a *prima facie* obviousness determination has not been made.

The Examiner cited §6.7.4 of the Bingham reference as teaching “the specified equations that define the weighted synchronization pattern”.<sup>11</sup> Perhaps it does. But “the specified equations that define the weighted synchronization pattern” is not the limitation recited in claim 63. Claim 63 recites the correlating of complex amplitudes of received values of the synchronization frame, with stored values, weighted by a weighting coefficient for each of the plurality of tones. The Examiner’s characterization of the disclosure of the Bingham reference does not meet the weighting limitation of the correlating step of the claim. Indeed, the Examiner’s characterization does not indicate whether the “weighted synchronization pattern” refers to transmitted or received signals, more specifically whether it refers to the performing of a correlation or rather the generating of a transmitted signal. Accordingly, even if the Examiner is correct in characterizing the operative teachings of the Bingham reference, that determination is an insufficient basis for a *prima facie* obviousness determination.

Furthermore, claim 63 does not require that the synchronizing pattern is weighted. Rather, claim 63 requires that it is the correlating of complex amplitudes of received values of the synchronizing frame that is weighted. A “weighted synchronization pattern”, to the extent taught by the Bingham et al. reference, has nothing to do with the manner in which the receiver will comprehend that pattern.

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<sup>10</sup> Office Action, *supra*, page 4.

<sup>11</sup> *Id.*

Applicants further submit that the Bingham reference in fact does not teach the weighting limitation in the correlating step of claim 63. To the extent that the cited passage of the Bingham reference teaches “weighting”, that passage reads:

These bits are used as follows: the first bit of a set of 512 is used for the carrier at d.c. (the power assigned to this carrier is, of course, zero, so the bit is effectively ignored); . . . Bits 128 and 129, which modulated the pilot carrier, are also effectively discarded because the phase of the pilot is determined by its own random pattern . . . .<sup>12</sup>

There is no mention in this passage, or elsewhere in the Bingham reference, of any action that is or ought to be taken at the receiver end of this synchronization symbol in carrying out its correlation with the known values. Indeed, this passage nowhere mentions any action to be taken at the receiver end in performing such a correlation. Rather, the passage reads from the viewpoint of the transmitter.<sup>13</sup>

Nor is the correlating step of claim 63, weighted by a weighting coefficient for each of the plurality of tones, inherently disclosed by the synchronization pattern and cited passage of the Bingham reference. The law requires that inherency be established by extrinsic evidence that clearly shows that “the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill.”<sup>14</sup> In the context of examination by the Patent and Trademark Office, there must be some “basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art.”<sup>15</sup>

As expressed in §6.7.4 and elsewhere in the Bingham reference, actions performed after receiving a signal are not specified. As noted above, the Bingham reference is silent regarding how the receiver is to comprehend the synchronization pattern – at most, it implies that the disclosed synchronizing pattern is to be comprehended. One can imagine any number of ways to

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<sup>12</sup> Bingham, *supra*, §6.7.4.

<sup>13</sup> *Id.* (“it can be used to synchronize the symbol boundaries of a DMT modulator . . .”; “the power assigned to this carrier is, of course, zero, . . .”; and “the last bit, which could be used to modulate carrier #256, is discarded. Bits 128 and 129, which modulate the pilot carrier, are also effectively discarded . . .”).

<sup>14</sup> *In re Robertson*, 169 F.3d 743, 49 USPQ2d 1949 (Fed. Cir. 1999), F.3d at 745, citing *Continental Can Co. v. Monsanto Co.*, 948 F.2d 1264, 1268, 20 USPQ2d 1746, 1749 (Fed. Cir. 1991).

<sup>15</sup> *In re Levy*, 17 USPQ 2d 1461 (Bd. Pat. App. & Interf. 1990).

synchronize with the transmitted synchronizing pattern, beginning with merely decoding each received symbol value for each tone, comparing a best guess of that value with the known synchronization pattern, and determining synchronization timing from the timing at which most of the transmitted and known symbol values match. There is nothing in such synchronizing that requires the weighting required by claim 63, much less rendering such weighting as necessarily present in the description of the transmitter in the Bingham reference to the extent that it would be so recognized by those skilled in the art.

Applicants further submit that the Hunt et al. reference, asserted against claim 68, also fails to teach such weighting. Rather, the Hunt et al. reference merely discloses changing the number of bits allocated to each of the multiple tones in multicarrier modulation communications, based on signal-to-noise ration. These teachings have nothing to do with the synchronizing of frame timing between a receiver to a transmitter, to which claim 63 is expressly directed. Accordingly, Applicants submit that the combination of the Hunt et al. reference with the other references still falls short of the requirements of independent claim 63.

And for the same rationale by which the Bingham reference does not disclose the weighting limitation of the correlating step of claim 63, Applicants submit that the motivation asserted by the Examiner for combining the Jasper and Bingham teachings is in error. As noted above, the Examiner asserted that the “weighted synchronizing pattern” of the Bingham reference would obviously be used in combination with the Jasper teachings “so as to conform to the standard”.<sup>16</sup> But the actions of the receiver in the DSL standard have little if anything to do with “conforming to the standard”. As expressed in §6.7.4 and elsewhere in the document, actions performed after receiving a signal are not specified by the standard; however, it is *transmitted* signals that must comply with the standard, so that receivers will recognize the protocols, synchronization symbols, and the like. The receiver can synchronize itself to the synchronization symbol specified in §6.7.4 in any way that it pleases, so long as synchronization is complete. Accordingly, there is nothing required of a receiver, in correlating its knowledge of the synchronizing pattern with the complex amplitudes of the received synchronizing frame, in

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<sup>16</sup> Office Action, *supra*, page 4.

order to conform with the standard. Accordingly, the skilled person would not look to the Bingham reference, even if it disclosed actions to be taken in correlating to a synchronizing pattern,<sup>17</sup> in order to conform any system to the standard. The alleged motivation used to support the §103 rejection is therefore in error.

Accordingly, because the Bingham reference neither expressly nor implicitly discloses weighting by a weighting coefficient for each of the plurality of tones, in the correlating of complex amplitudes from a received synchronizing frame with corresponding stored values of the synchronizing pattern, Applicants submit that the combined teachings of the Jasper and Bingham references<sup>18</sup> fall short of the requirements of claim 63. Furthermore, Applicants submit that the motivation asserted by the Examiner for making this combination is in error. For these reasons, therefore, Applicants traverse the §103 rejection of claims 63 through 68 in this case, and submit that these claims are in fact patentably distinct over the applied references.

According to the method of claim 63, the correlating step involves a weighting coefficient for each tone. This weighting coefficient permits those tones that are to not contribute to the comparison result,<sup>19</sup> or that are noisier than other tones,<sup>20</sup> to be excluded or de-emphasized from the comparison result. Not only is this weighting not disclosed or necessary As a result, correlation to the synchronizing pattern is more accurate according to the claimed method, and the power of the comparison result will be improved to permit a more accurate and reliable synchronization with the synchronizing frame. Applicants therefore submit that the differences between the method of claim 63 and the prior art are substantial, in that these differences directly give rise to important benefits in DMT communication.

Applicants therefore also submit that claim 63 and its dependent claims are in fact patentably distinct over the applied references.

As previously argued, claim 68 further requires, relative to claim 63 upon which it depends, that each weighting coefficient corresponds to the signal-to-noise ratio of its associated

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<sup>17</sup> Which it does not.

<sup>18</sup> And also the Hunt et al. reference.

<sup>19</sup> As in claims 65 through 67.

<sup>20</sup> As in claim 68.

tone. In addition to the reasons discussed above relative to claim 63, Applicants submit that the combined teachings of the applied references fall further short of the requirements of claim 68, and that therefore this claim is further patentably distinct over those references.

There is no disclosure or suggestion from any of the applied references to derive the weighting coefficient for each tone based on that tone's signal-to-noise ratio, as claimed. Because none of the references, including the Hunt et al. reference, disclose "a weighting coefficient for each of the plurality of tones" as required by claim 63, those references necessarily fail to disclose the additional limitation of claim 68 in which those weighting coefficients are based on the tone signal-to-noise ratio. While the Hunt et al. reference discloses changing the bit loading on the various tones within a multicarrier modulation communication, there is no mention nor suggestion whatsoever about weighting correlating of a frame synchronization pattern, as required by claim 68. Nor is there any suggestion from the prior art to, or indication that one of ordinary skill and creativity would, modify these teachings to perform such weighting according to the signal-to-noise ratio at each of those tones. The applied references therefore fall further short of the requirements of claim 68.

For these additional reasons, Applicants submit that claim 68 is further patentably distinct over the references applied against the claims.

Based on these remarks, Applicants respectfully submit that all claims in this case are in condition for allowance. Favorable consideration of this application is respectfully requested.

Respectfully submitted,

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